

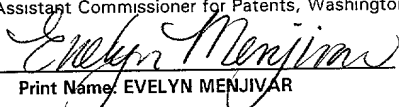
PATENT APPLICATION  
DOCKET NO. SAM1.0081

**METHODS AND APPARATUS FOR ADVANCED INTERACTIVE SERVICES  
FOR DIGITAL TELEVISION AND VIDEO SERVICE NETWORKS AND  
RECEIVERS**

By  
Yeong-Taeg Kim

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**CROSS-REFERENCES TO RELATED APPLICATIONS**

Applicant claims the benefit of the U.S. Provisional Application No. 60/173,173 entitled "Advanced Interactive Services For Digital TV and Video Service Networks," filed on December 27, 1999, which application is incorporated herein by reference.

**FIELD OF THE INVENTION**

This invention relates to digital television and video services, and more particularly, to a method and apparatus for allowing interactive user/provider management and control of digital television program transmission.

**BACKGROUND OF THE INVENTION**

Digital video and television broadcasts are well known in the art. Common digital video service networks which provide digital video and television broadcasts include digital cable TV, digital satellite TV, video-on-demand, and terrestrial digital TV broadcasting systems. In each of these services a service operator broadcasts information to a multitude of end users in the form of digital television signals. These digital television signals are broadcast in the MPEG-2 format.

MPEG-2 is a well known standard which was adopted on November 4, 1994 by the ISO (International Organization for Standards) Motion Picture Experts Group (MPEG) for audio/video digital signal compression, configuration and transmission. The MPEG-2 Standard

allows for consistent and uniform digital video signal sampling, coding, transmission and reception throughout the world and is very well known in the art.

Through the known systems designed according to the MPEG-2 Standard (which is also known as International Standard ISO/IEC 13818-1), the packetizing, multiplexing, and, sending of coded bit streams of multiple programs may be accomplished. Here multiple programs, along with audio and video overlays may be transmitted by a service operator and received by an end user.

Since the adoption of the MPEG-2 Standard, service networks have proliferated around the world which networks provide digital television programming to end users. These service networks generally consist of two (2) types of networks. The first type of service network describes digital video content distribution services such as digital cable TV service, digital satellite TV service, video-on-demand service where viewers pay monthly or per program service charges to the service operator. The second type of service network describes terrestrial Digital TV broadcasting networks where users are not required to pay service charges for viewing the programs transmitted by the broadcasters. Typically, the main revenue of these broadcasters stem from commercial advertisements located between their programs. However, in each of these types of known systems, there is very limited end user interactivity.

During the past decade, a further industry has developed to produce "Infomercials" and wholesale channels solely dedicated to the sale of products and services. The Infomercials are generally extended advertisements which replace a regular entertainment style program instead of being an addendum or limited commercial between the regular programming. Infomercials generally contain information about a product or service which is being sold and requires that the user telephone the Infomercial producer to purchase the product or service.

The wholesale channels are television based catalogues of products and services which display the products for the viewer while the viewer calls for the products that they desire.

Further types of commercials are well known in the art. However, none of the televised commercial advertisements provide interactivity where the user can interactively select the programs desired. Furthermore, none of the commercial programs provide any type of automatic notice to the viewer that the specific commercial programming is being broadcast at a particular time. Additionally, none of the network services provide a system for determining the viewer's viewing habits and desires and then addressing those specific viewing habits by providing programming specifically addressed to the user. Even further, none of the digital TV network services broadcast Background Commercials to the end user, for which the end user's permission is required, and none of the digital TV network services provide incentives or compensate the end user's for their viewing choices or viewing record.

### **OBJECTS OF THE INVENTION**

Therefore, it is an object of the present invention to provide a digital service network with interactivity where the user can interactively select the programs desired.

It is yet another object of the present invention to provide a digital service network which provides automatic notice to the viewer that specific commercial programming is being broadcast at a particular time.

It is yet still another object of the present invention to provide network services which provide a system for determining the viewer's viewing habits and desires and then addressing those specific viewing habits by providing programming specifically addressed to the user.

It is yet still another object of the present invention to provide digital TV network services which broadcast Background Commercials to the end user, and require the end user's permission.

It is yet still another object of the present invention to provide digital TV network services which yield incentives or compensate the end user's for their viewing choices or viewing record.

These, together with other objects of the present invention, along with the various features of novelty which characterize the present invention, are pointed out with particularity in the claims annexed to and forming a part of this disclosure.

## **SUMMARY OF THE INVENTION**

The above and other objects are achieved by the present invention, wherein the preferred embodiments of the present invention provide an interactive digital television broadcast system which transmits Background Commercials in addition to regular scheduled programing to an end user, the end user selects whether, when and how it wishes to view the Background Commercials, and return information is communicated to the network service operator.

In the herein described preferred embodiments of the present invention, new digital television broadcast systems are described, which for purposes of this disclosure shall be named as the "View-to-Save service" and "View-for-Money service." These preferred embodiments are described in reference to the known digital video service networks described above including the digital cable TV, digital satellite TV, video-on-demand, and terrestrial Digital TV broadcasting systems. However, neither the present invention nor the preferred embodiments should be limited to those specific networks.

In the preferred embodiments of the present invention, Background Commercials are encoded, packetized, and multiplexed with packetized bitstreams of regular programs within a transmitted MPEG-2 signal, and then transmitted to the end-users through one of the digital video service networks. Background Commercials are commercial advertisement programs which requires a user's permission, or, request so that they may access a user's presentation unit. The end users receive the combined broadcast MPEG-2 signal, which includes both the normally broadcast digital video signal and the Background Commercials, through a receiver which is specifically designed to be used with the preferred embodiments of the present invention.

The receiver of the preferred embodiments of the present invention includes a switch

whereby the end user can enable or disable receipt and display of the service function of the preferred embodiments of the present invention. Through this switch, the end user can thereby enable or disable the rendering and/or presentation process of Banner Information of the received Background Commercials so that the rendered Banner Information of the Background Commercials can or can't be presented at the end user's presentation device. Banner Information is information which is related to the Background Commercials broadcast, and which takes the form of text, graphics, and images associated with the content of the Background Commercials.

The preferred embodiments of the present invention allow the user to request to view the audio/video contents of the Background Commercials from the Receiver when the received Background Commercials has audio/video bit streams. Alternatively, the end user can request to save the audio/video bit streams of the Background Commercials and can view them later when viewing is more desirable or convenient. If the end user selects to save the audio/video bit streams for later viewing, the receiver then records the user's Background Commercials-viewing data in an associated storage unit.

In the preferred embodiments of the present invention, a return channel allows the user's viewing choices and other such information to be communicated back to the associated service operator. In exchange for, and based upon this returned information, i.e., the user's Background Commercials-viewing record and programming selections, the service operator can then provide benefits to the end user in the form of savings on monthly service charges if applicable, giving away pay-per-view broadcasts similar to the end user's previous viewing selections, giving commercial coupons for future savings, providing revenue sharing arrangements, etc.

One preferred embodiment of the interactive digital video service network of the present invention described herein comprises: means for providing a digital signal, the digital signal having information reflective of at least one regular program and at least one Background Commercial; an end user, the end user having a receiver for receiving the digital signal and a presentation unit for displaying at least a portion of the digital signal; a channel communicating the digital signal from

the means for providing a digital signal to the receiver; selection means for allowing the end user to select between the at least one regular program and the at least one Background Commercial for display on the presentation unit; and a return channel communicating Background Commercial Viewing Data from the receiver to a digital service operator. In this preferred embodiment, the information reflective of the at least one Background Commercial contains Audio-Visual Information and/or Banner Information, the Banner Information being presented to the presentation unit with the at least one regular program. This preferred embodiment further comprises a control switch whereby the user can filter the Background Commercial portion of the digital signal from being delivered to the presentation unit, and it may further comprise a means for communicating the Background Commercial Viewing Data over the return channel from the receiver to the service operator, and means for updating a Background Commercial Viewing Record with the Background Commercial Viewing Data communicated from the receiver to the digital service operator.

A further preferred embodiment of the interactive digital video service network of the present invention described herein comprises: means for providing a digital signal, the digital signal having information reflective of at least one regular program and at least one Background Commercial, wherein the information reflective of the at least one Background Commercial contains Banner Information; an end user, the end user having a receiver for receiving the digital signal and a presentation unit for displaying at least a portion of the digital signal, the Banner Information being presented to the presentation unit with the at least one regular program; and a channel communicating the digital signal from the means for providing a digital signal to the receiver. This preferred embodiment further comprises selection means for allowing the end user to select between the at least one regular program and the at least one Background Commercial for display on the presentation unit, and may further comprise a return channel for communicating Background Commercial Viewing Data from the receiver to a digital service operator. In this preferred embodiment, the information reflective of the at least one Background Commercial contains Audio-Visual Information and/or Banner Information, the Banner Information being presented to the presentation unit with the at least one regular program. In this further embodiment a control switch allows the user to filter the Background Commercial portion of the digital signal from being

delivered to the presentation unit. This further embodiment further comprises a means for communicating the Background Commercial Viewing Data over the return channel from the receiver to the service operator, and means for updating a Background Commercial Viewing Record with the Background Commercial Viewing Data communicated from the receiver to the digital service operator.

A method which drives the service network embodiment of the present invention, comprises the steps of: creating a combined digital television signal which combines information reflective of regular programming and Background Commercials, the information reflective of the Background Commercials containing Audio-Visual Information and/or Banner Information; transmitting the combined digital television signal over a channel to end users; receiving the combined digital television signal at a receiver; selecting a selected portion of the combined digital signal from the information reflective of the regular programming and the Background Commercials for display at a presentation unit; and displaying the selected portion of the combined digital signal on the presentation unit. This method may further comprise the steps of creating Background Commercial Viewing Data, communicating the Background Commercial Viewing Data from the receiver to the service operator, and updating a Background Commercial Viewing Record with the Background Commercial Viewing Data communicated from the receiver to the service operator. This method may also comprise the step of presenting Banner Information with the selected portion of the combined digital signal for display on the presentation unit.

A preferred embodiment of a receiver for an interactive digital video service network within the present invention comprises: means for receiving a digital signal, the digital signal having information reflective of a regular program and at least one Background Commercial, wherein the information reflective of the at least one Background Commercial contains Banner Information; means for decoding the digital signal and providing a first signal reflective of the regular program and a second signal reflective of the at least one Background Commercial; means for receiving the signal reflective of the at least one Background Commercial and providing a signal reflective of the Banner Information; and means for providing a video output signal, the means for providing the



video output signal combining information from the signal reflective of the regular program and the signal reflective of the Banner Information. This receiver embodiment may further comprise a User Interface means for obtaining User commands to enable or disable the inclusion of Banner Information in the video output signal and a control unit for providing control signals reflective of the User commands. This receiver embodiment may further comprise a storage means for storing Background Commercial view data and a transmission means for providing a return signal reflective of the Background Commercial view data.

A further preferred embodiment of a receiver for an interactive digital video service network within the present invention comprises: means for receiving a digital signal, the digital signal having information reflective of a regular program and at least one Background Commercial, wherein the information reflective of the at least one Background Commercial contains Audio-Visual Information and Banner Information; means for decoding the digital signal and providing a first signal reflective of the regular program and a second signal reflective of the at least one Background Commercial; means for receiving the second signal reflective of the at least one Background Commercial and providing a first BC signal reflective of the Banner Information related to one of the at least one Background Commercials and a second BC signal reflective of Audio-Visual Information related to the one of the at least one Background Commercials; and means for providing a video output signal, the means for providing the video output signal combining information from one of (i) the signal reflective of the regular program or (ii) the second BC signal, with information from the signal reflective of the Banner Information. In this further receiver embodiment the means for receiving the signal reflective of the at least one Background Commercial provides a third BC signal reflective of information identifying the one of the at least one Background Commercials. This further receiver embodiment further comprises a selection means for allowing an end user to select between information from the signal reflective of the regular program and information from the second BC signal for inclusion in the video output signal. This further receiver embodiment also further comprises a User Interface means for obtaining User commands to enable or disable the inclusion of Banner Information and/or the second BC signal in the video output signal and a control unit for providing control signals reflective of the User commands. A storage means is included for

storing Background Commercial view data and a transmission means for providing a return signal reflective of the Background Commercial view data. The same or a further storage means may be provided for storing information from the second BC signal, and means for replaying the second BC signal stored in the storage means to the means for providing a video output signal for inclusion in the video output signal. The same or a further storage means may also be provided for storing information from the signal reflective of the regular program, and means for replaying the signal reflective of the regular program stored in the storage means to the means for providing a video output signal for inclusion in the video output signal.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

The foregoing and other objects, advantages and features of the invention, and the manner in which the same are accomplished, will become more readily apparent upon consideration of the following detailed description of the preferred embodiment of the present invention taken in conjunction with the accompanying drawings which illustrate preferred and exemplary embodiments, and wherein:

**Figure 1** shows a basic block diagram of the View-to-Save service of the preferred embodiments of the present invention.

**Figure 2** shows a basic block diagram showing how the multiplexed bit streams of a regular program data and the data from Background Commercials are generated based on the MPEG-2 Systems the preferred embodiments of the present invention.

**Figure 3** shows a basic block diagram of the "View-for-Money" service of the second preferred embodiment of the present invention which is provided for terrestrial, or land based digital TV networks.

**Figure 4** shows a basic block diagram of a first embodiment of a receiver for the View-to-Save and View-for-Money services of the first and second preferred embodiments, respectively, of the present invention.

**Figure 5** shows a basic block diagram of a second embodiment of a receiver for the View-to-Save and View-for-Money services of the first and second preferred embodiments, respectively, of the present invention.

Figure 6 shows a basic block diagram of a third embodiment of a receiver for the View-to-Save and View-for-Money services of the first and second preferred embodiments, respectively, of the present invention.

## 5 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The following description is provided to enable any person skilled in the art to make and use the invention and sets forth the best modes presently contemplated by the inventors for carrying out this invention. Various modifications however, will remain readily apparent to those skilled in the art, since the generic principles of the present invention have been completely defined.

10 The preferred embodiments of the present invention described herein are segregated between two (2) different types of services. The first service applies to digital video content distribution services such as digital cable TV service, digital satellite TV service, video-on-demand service, and is described as the "View-to-Save" broadcast service. The second service provided by the preferred embodiments for terrestrial Digital TV broadcasting networks is herein called and defined as the "View-for-Money" service. The names of those services are intended merely for easy description of the preferred embodiments of the present invention and should not be construed to limit the scope of the invention in any way.

20 For the purpose of clear description of the preferred embodiment of the present invention, the following terminology is defined:

25 Background Commercials are commercial advertisement programs which require a user's permission, or, request in order for them to access the user's presentation unit. Conversely, if there is no permission or request from a user, then Background Commercials will not be presented at the user's presentation unit. Thus, unless the user desires to receive the Background Commercials, then the user will not be bothered by any Background Commercials while watching regular programs. Background Commercials, as defined herein, differ from typical commercial advertisements because a typical commercial advertisement is located between or in the middle of regular non-commercial

programs. Whereas, Background Commercials can be available anytime, even when a regular program is displaying, i.e., the Background Commercials are carried in the background of the regular non-commercial.

5           Banner Information is information descriptive and/or related to the Background Commercials. Banner Information takes the form of text, graphics, and images, which are associated with the content of the Background Commercials. Alternatively, Audio-Visual Information of a Background Commercials is the audio and video contents of the Background Commercials similar to typical commercial within regular TV programs. Hence, Background Commercials can have  
10       Banner Information and/or Audio-Visual Information.

### **View-to-Save Service : A Service for Digital Cable TV, Digital Satellite TV, and Video-on-Demand Service Networks.**

15           Turning now to the drawings, Figure 1 shows a basic block diagram of the View-to-Save system 100 of the preferred embodiments of the present invention. In this View-to-Save system 100, a digital video or TV service operator 111 transmits a combined MPEG-2 signal 113 over a channel 112 to receiver 115 of the end users 114. Within the transmitted combined MPEG-2 signal 113, Background Commercials 116 are encoded, packetized, multiplexed along with packetized bit streams of regular programs 117.  
20

25           The methods of packetizing, multiplexing, and, sending coded bit streams of multiple programs are well known in the art, and they generally implement the International Standard ISO/IEC 13818-1 which is also known as MPEG-2 Systems. A simplified illustration showing the multiplexing of bit streams of regular program data along with the data from Background Commercials based on the MPEG-2 Systems is depicted in Figure 2. In the signals illustrated within Figure 2, the Transport Stream which is specified in the MPEG-2 Standard is composed of a *header* followed by a *payload*.

As shown in Figure 2, each of the regular program signal 117 and the Background Commercials 116 undergo a coding step 201 to create coded bit streams 202. Each of the coded bit streams 202, reflecting the regular program signal 117 and the Background Commercials 116, are then packetized 203 and fed to a multiplexer 204. The multiplexed transport stream is then modulated 206 and sent to the channel.112.

The actual structure and operation of the View-to-Save receiver ("VSR") of the preferred embodiment of the present invention is described in more detail below. However, referring back to Figure 1, the VSR 115 receives the signal 113 from the channel 112, demodulates the signal 113 to retrieve the bit streams of the regular programs 117 and the Background Commercials 116, and then extracts the bit streams of the regular programs 117 and the Background Commercials 116. The regular programs 117 are normally decoded and delivered to a presentation unit 118 without any alteration if the View-to-Save service function of the receiver 115 has been disabled by the user 114.

When a user 114 requests the View-to-Save service or, in other words, if the user 114 enables the View-to-Save service function of the Receiver 115, the Background Commercials 116 are presented to the presentation unit118.

Various options also can be made possible in delivering the Background Commercials116 to the user's presentation unit 118 depending on the type of the Background Commercials 116 received. If the received Background Commercials 116 contain only Banner Information, then the rendered Banner Information is overlaid to the video output of the regular programs 117. If the received Background Commercials 116 contain Audio-Visual Information in addition to the Banner Information, then the VSR 115 notifies the user 114 that the received Background Commercials 116 have additional Audio-Visual Information while the rendered Banner Information is delivered to the presentation unit 118.

Based upon this notification, the user 114 will decide whether to view the additional Audio-Visual Information of the Background Commercials 116. If the user 114 decides to view the

additional Audio-Visual Information of the Background Commercials 116, then the audio and video streams of the Background Commercials 116 are decoded and presented to the user's presentation unit 118.

5           Alternatively, the user 114 can also request the VSR 115 to store the bit streams of the additional Audio-Visual Information of the Background Commercials 116 for later viewing. In other words, the bit streams of the Background Commercials 116 that the user 114 requests to store will be stored in a digital storage device such as a hard disk drive or other type of digital storage memory device. The stored Audio-Visual Information of the Background Commercials 116 can then be  
10       decoded and presented to the user's presentation unit 118 when the user 114 requests to view the stored Background Commercials 116.

15           In the preferred embodiment of the invention, bit streams of multiple Background Commercials 116 can be stored in the storage device of the VSR 115, and Banner Information from the multiple Background Commercials 116 can be presented to the user's presentation unit 118 when the View-to-Save service function is enabled by the user 114. When there are multiple Background Commercials available, the VSR 115 of the preferred embodiment of the invention decodes and presents the Audio-Visual Information of the Background Commercials 116 that the user 114 selects to the presentation unit 118.

20           While all these transactions are made, the receiver 115 records data reflective of the user's Background Commercials 116 viewing habits and choices to an internal memory device. Fundamentally, this process will record which Background Commercials 116 were presented at the user's presentation unit 118 by the user's request. Any information which is interesting for future  
25       management of the View-to-Save service by the service operator 111 can be pre-specified and recorded when the user's Background Commercials-viewing data is recorded. Such information can be, but is not limited to, the date or time stamp reflecting when the Background Commercials 116 were presented to the presentation unit 118, channel information such as channel number, program identification of the regular programs 117 that the user 114 was watching when the Background

Commercials 116 were requested to be presented to the user's presentation unit 118, identification which Background Commercials 116 were chosen, their running time, etc.

5 The View-to-Save service embodiment illustrated in Figure 1 then undertakes a process of sending the user's Background Commercials-viewing data back to the service operator 111 through a return channel 119. For management purposes, unique identifications may be assigned to each user 114 or each VSR 115. Depending upon how the VSR 115 is designed, the VSR 115 can send the user's Background Commercials-viewing record to the service operator 111 at the user's request, or at a request or time which has been previously programmed internally in the VSR 115. Upon  
10 receiving the user's Background Commercials-viewing record, the service operator 111 is able to then update and manage the users' Background Commercials-viewing records.

15 The final process of the View-to-Save service embodiment illustrated in Figure 1 is that the service operator 111 is able to provide certain benefits to the user 114 in return for the user's participation in the View-to-Save service of the preferred embodiment of the present invention. These benefits may take various forms as a function of the user's Background Commercials-viewing record. Examples include, but are not limited to, savings on monthly service charges, if applicable, giving away free pay-per-views programs which the user 114 would normally have to pay for, giving commercial coupons for saving, providing some sort of revenue sharing package, or other type of  
20 compensation and incentive for participating in the service. For purposes of illustration, this return of compensation from the service operator 111 to the user 114 is shown as arrow 120 in Figure 1.

### **View-for-Money Service: A Service for Terrestrial Digital TV Networks**

25 The View-to-Save service of the first preferred embodiment of the present invention shown in Figure 2 is mostly suitable for the digital video or digital TV service networks in which a service operator 111 broadcasts digital video contents over their networks having multiple channels such as digital cable TV networks, video-on-demand networks, and satellite digital video service networks. In such service networks, users 111 are subject to monthly service charges from the

service operator 111.

Alternatively, Figure 3 illustrates a second preferred embodiment of the present invention which is herein called the "View-for-Money service" and is provided for terrestrial, or land based digital TV networks where users are not required to pay service charges for viewing the programs transmitted by the broadcasters. Typically, the main revenue of these broadcasters stem from commercial advertisements located between their programs.

In the View-for-Money service 300 illustrated in the second preferred embodiment of the present invention, the broadcasters broadcast Background Commercials 316 with their respective regular programs 317 to the air where a specific channel 312 or frequency range is assigned to each broadcaster. The View-for-Money Digital TV (VM-DTV) 315, which controls the View-for-Money service of the second preferred embodiment for the user 314, receives the signals available in the air, and extracts the bitstreams of the regular programs 317 and the Background Commercials 316 of the tuned channel 312.

The next function of the View-for-Money service of the second preferred embodiment of the present invention is same as that described for the View-to-Save service in the first preferred embodiment of the invention described above. The regular programs are normally decoded and delivered to the presentation unit without any alteration if the View-for-Money service function has been disabled by the user 314. Alternatively, when a user 314 requests access to the View-for-Money service, or if the user enables the View-for-Money service function on the VM-DTV 315, then the Background Commercials 316 are presented at a presentation unit connected to the VM-DTV 315.

When the View-for-Money service is to be received by the user, if the received Background Commercials 316 contain only Banner Information, then the rendered Banner Information is overlaid to the video output of the regular programs 317. Alternatively, if the received Background Commercials 316 contains further Audio-Visual information in addition to the Banner Information,



then the VM-DTV 315 notifies the user 314 that the received Background Commercials 316 contain additional Audio-Visual information while the rendered Banner Information of the Background Commercials 316 is delivered to the user 314.

5           Based upon this notification, that the Background Commercials 316 contain additional Audio-Visual information, the user 314 may further request the VM-DTV 315 to display the Audio-Visual information at that time. If the user 314 requests to view the additional Audio-Visual information of the Background Commercials 316, then the audio and video streams of the Background Commercials 316 are decoded and presented to the user's presentation unit.

10           Alternatively, the user 314 can request the VM-DTV 315 to store the bitstreams of the additional Audio-Visual information of the Background Commercials 316 for later viewing. In other words, some bitstreams of the Background Commercials 316 that the user selects can be stored in a digital storage device such as a hard disk drive or other digital memory, and they will then be decoded and presented to the user's presentation unit when the user requests to view the stored Background Commercials 316 at a later time.

20           Bitstreams of multiple Background Commercials 316 can be stored in the storage device of the VM-DTV 315, and multiple Banner Information signals can be presented to the user's presentation unit when that service function is enabled. If there is Banner Information from multiple Background Commercials 316 being presented to the user 314, then the VM-DTV 315 decodes and presents the additional Audio-Visual information of the Background Commercials 316 which the user selects.

25           As discussed above with respect to the first preferred embodiment of the present invention, while all of these transactions are being made by the user 314, the VM-DTV 315 records all of the user's Background Commercials-viewing data to the internal memory device of the VM-DTV 315. Fundamentally, this process is to record which Background Commercials 316 were presented at the user's presentation unit by the user's request.

Any desired information for the proper management of the View-for-Money service by the  
broadcasters 310 and/or View-for-Money service operator (VM-SO) 311 can be pre-specified and  
used when the user's Background Commercials-viewing data is recorded. Such information can be,  
but is not limited to, the date or time stamp of when the Background Commercials 316 were selected  
or viewed, channel information such as the channel number or the broadcaster's identification, the  
program identification that the user was watching when the Background Commercials were  
requested to be presented to the user's presentation unit, identification of the a Background  
Commercials selected, its running time, etc.

As discussed above with respect to the first preferred embodiment of the present invention,  
the View-for-Money service 300 of the second preferred embodiment of the present invention further  
implements a process which sends the user's Background Commercials-viewing record to the VM-  
SO 311 through a return channel 319. For proper management of the service, a unique identification  
is assigned to each user 314 or to each VM-DTV 315. Depending upon the design of the VM-DTV  
315, the VM-DTV 315 sends the user's Background Commercials-viewing record to the VM-SO  
311 at the user's request, or based upon an instruction programmed internally within the VM-DTV  
315.

Upon receiving the user's Background Commercials-viewing record, the VM-SO 311  
updates and manages the user's Background Commercials-viewing record. In the View-for-Money  
service Network 300 of the second preferred embodiment of the present invention, it is important  
that the VM-SO 311 and each broadcaster 301 sending Background Commercials have some sort  
of contract regarding the Background Commercials 316 transmitted to the user 314, or that they have  
some other means for directing incentives and/or interactive responsiveness to the user 314 based  
upon the user's Background Commercials-viewing records. The contract 302 can take various  
forms, i.e., charging the broadcasters for the Background Commercials 316 that they transmitted, or  
for the Background Commercials 316 which were selected for viewing at the users' presentation  
devices.

Based upon the users' Background Commercials-viewing records, the final process of the View-for-Money service 300 of the second preferred embodiment of the present invention is that the VM-SO 311 compensates or otherwise provides incentives or other interactive input based upon the users' Background Commercials-viewing records. A simple example of compensation includes, but is not limited to, revenue sharing with the user 314 from the VM-SO 311 for profits arising from the View-for-Money service with those users 314 who viewed the Background Commercials 316.

### ***The View-to-Save and View-for-Money Receivers***

The difference between the View-to-Save service 100 and the View-for-Money service 300 of the first and second preferred embodiment of the present invention discussed above, is how the digital contents (regular programs plus Background Commercials) are delivered to the end users. For the View-to-Save service 100, a service operator 111 sends and manages digital contents (regular programs 117 and Background Commercials 116) for the entire channel, i.e., all of the broadcasters of their networks (cable and satellite), whereas separate broadcasters 301 transmit each of their digital contents to the air, or to the users 314 for the View-for-Money service 300.

In terms of functionality for performing these novel interactive services, however the VSR 115 and VM-DTV 315 require basically the same functions: receive digital bit streams, extract and deliver the Banner Information of a Background Commercials to the user's presentation device if a user enables the service function, decode and present the Audio-Visual Information of the Background Commercials at the user's request, record and manage the user's Background Commercials-viewing data, and update the user's Background Commercials-viewing record to the service operator via a return channel.

Referring now to Figure 4, a first embodiment of the receiver 400 for View-to-Save service 100 and the View-for-Money service 300 includes a channel demodulation unit 401 which demodulates the received signal and extracts the bit streams of the regular program and the Background Commercials from a user-tuned channel 402.

A TS demultiplexing and depacketization unit 403 demultiplexes the program bitstream 417 (audio and video bit streams) and the Background Commercials bit streams 416 which are received from the channel demodulation unit 401.

5 A Background Commercials extraction and rendering unit 404 extracts and renders the Banner Information 428 of the received Background Commercials, sends Background Commercials information data 425 to a control unit 405 for managing purposes, sends audio/video bit streams 429 of the Background Commercials to a storage device 406 to save, and, sends the rendered Banner Information 428 to a video reconstruction unit 407 to present to the user's presentation device.

10 The storage device(s) 406, may be a hard drive or any other type of digital storage device, saves audio/video bit streams of a Background Commercials 429 and the user's Background Commercials-viewing record. A selector unit 408 selects between the audio/video bit streams of the regular program 427 and the audio/video bit streams of the Background Commercials 429 stored in the storage device 406 in accordance with the control signal 451 from the control unit 405. The control unit 405 couples to the User interface 410 to obtain the user's command 453 to view the Audio-Visual Information of the Background Commercials received 429.

15 Audio/Video decoders 409 decode the selected audio and video coded bit streams 430 and send a decoded video signal 461 to the video reconstruction unit 407. The video reconstruction unit 407 reconstructs the output video 462 from the decoded video output 461 and the rendered Banner Information 428 in accordance with the control signal 452 from the control unit 405.

20 The control unit 405 also obtains the user's commands 453 to enable/disable the service function, i.e., if the user enables the View-to-Save or View-for-Money service function, as the case may be.

25 As stated above, the Video Reconstruction unit 407 generates the output video signal 462 from the decoded video 461 and the rendered Banner Information 428. If the user disables the

service function, then the Video Reconstruction unit 407 generates the output video signal 462 only with the decoded video 461.

The Control unit 405 receives and interprets the user's commands 453, receives the Background Commercials information data 425 from the Background Commercials extraction and rendering unit 404, controls the storage device(s) 406 to save the audio/video bit streams 429 to the storage device(s) 406, records the user's Background Commercials-viewing data 471 to the storage device(s) 406, controls the selector unit 408 and the storage device(s) 406 to send the saved audio/video bit streams of the Background Commercials 429 previously stored in the storage device(s) 406 to the Audio/Video decoders 409 in accordance with the user's request to view the Audio-Visual Information of the Background Commercials received, and reads and manages the user's Background Commercials-viewing record 471 from the storage device(s) 406 and then sends that Background Commercials-viewing record 471 to the service operator 411 through a return channel 412.

Depending on applications, a receiver may be limited so that it is only capable of presenting Banner Information to the users. Figure 5 shows a basic block diagram of a second embodiment of a receiver for the View-to-Save and View-for-Money services of the first and second preferred embodiments, respectively, of the present invention. In this second embodiment of the receiver for View-to-Save and View-for-Money services, the receiver 500 is configured to render only the Banner Information of Background Commercials, i.e., no feature for further decoding and presenting of the Audio-Visual Information of the Background Commercials is provided. This embodiment provides a cost effective way of designing the receiver 500. In this embodiment of the receiver 500 each of the components operate in a similar manner to the receiver 400 illustrated in Figure 4.

Referring now to Figure 5, a second embodiment of the receiver 500 for the View-to-Save service 100 and the View-for-Money service 300 includes a channel demodulation unit 501 which demodulates the received signal and extracts the bit streams of the regular program and the Background Commercials from a user-tuned channel 502.

A TS demultiplexing and depacketization unit 503 demultiplexes the program bitstream 517 (audio and video bit streams) and the Background Commercials bit streams 516 which are received from the channel demodulation unit 501.

5 A Background Commercials extraction and rendering unit 504 extracts and renders the Banner Information 528 of the received Background Commercials, sends Background Commercials information data 525 to a control unit 505 for managing purposes, and, sends the rendered Banner Information 528 to a video reconstruction unit 507 to present to the user's presentation device.

10 Audio/Video decoders 509 decode the selected audio and video coded bit streams of the regular program 517 and send a decoded video signal 561 to the video reconstruction unit 507. The video reconstruction unit 507 reconstructs the output video 562 from the decoded video output 561 and the rendered Banner Information 528 in accordance with the control signal 552 from the control unit 505.

The control unit 505 also obtains the user's commands 553 to enable/disable the service function, i.e., if the user enables the View-to-Save or View-for-Money service function, as the case may be.

20 As stated above, the Video Reconstruction unit 507 generates the output video signal 562 from the decoded video 561 and the rendered Banner Information 528. If the user disables the service function, then the Video Reconstruction unit 507 generates the output video signal 562 only with the decoded video 561.

25 The Control unit 505 receives and interprets the user's commands 553, receives the Background Commercials information data 525 from the Background Commercials extraction and rendering unit 504, controls the storage device(s) 506 to record the user's Background Commercials-viewing data 571 to the storage device(s) 506, and reads and manages the user's Background Commercials-viewing record 571 from the storage device(s) 506 and then sends that Background

Commercials-viewing record 571 to the service operator 511 through a return channel 512.

Figure 6 illustrates a third embodiment of a receiver 600 with the feature that a user can continuously watch a regular program after the user has delayed that regular program so that the user could watch either stored or currently transmitted Audio-Visual Information of Background  
5 Commercials. This third embodiment of the receiver 600 addresses potential discontinuity in the user's watching of regular programing while a user views the Audio-Visual Information of Background Commercials by saving the bit streams of the regular programs 617 in a storage device(s) 606. Those regular program bit streams 617 can then be played back after the user viewed  
10 the Audio-Visual Information of a Background Commercials.

The third embodiment of the receiver 600 displayed in Figure 6 operates in a very similar manner to the receiver 400 depicted in Figure 4. However, the receiver 600 also includes a play-back control unit 615 which controls the bitstream flow between the TS Demultiplex unit 603 and the selector unit 608.

During normal operation, the play-back control unit 615 delivers the regular program bitstream 617 directly from the TS Demultiplexing unit 603 to the selector unit 608. Alternatively, if the user 650 requests that the audio/video bit streams of the Background Commercials 629 be played, then the control unit 605 sends a control signal 651 to the selector unit 608. The selector unit 608 then feeds the audio/video bit streams of the Background Commercials 629 from the storage device(s) 606 to the Audio/Video decoders 609 instead of the regular program bitstream 617. Similarly, when the audio/video bit streams of a Background Commercials 629 are being decoded by the Audio/Video decoders 609, the play-back control unit 615 directs the bit streams of regular  
20 program 617 coming from the TS Demultiplex unit to the storage device to be saved. This is all controlled from the control unit 605 sending a control signal 651 to the selector unit 608.  
25

After the user 650 has finished viewing the Audio-Visual Information of the Background Commercials 629, the play-back control unit 615 sends the saved bitstream of the regular program

617 from the storage device(s) 606 to the selector unit 608. In this way, the user 650 can continuously watch the regular program and start it again right at the spot where it was paused when the user 650 began to view the Audio-Visual Information of the Background Commercials 629.

5 Referring still to Figure 6, a first embodiment of the receiver 600 for View-to-Save service 100 and the View-for-Money service 300 includes a channel demodulation unit 601 which demodulates the received signal and extracts the bit streams of the regular program and the Background Commercials from a user-tuned channel 602.

10 A TS demultiplexing and depacketization unit 603 demultiplexes the program bitstream 617 (audio and video bit streams) and the Background Commercials bit streams 616 which are received from the channel demodulation unit 601.

15 A Background Commercials extraction and rendering unit 604 extracts and renders the Banner Information 628 of the received Background Commercials, sends Background Commercials information data 625 to a control unit 605 for managing purposes, sends audio/video bit streams 629 of the Background Commercials to a storage device 606 to save, and, sends the rendered Banner Information 628 to a video reconstruction unit 607 to present to the user's presentation device.

20 The storage device(s) 606, may be a hard drive or any other type of digital storage device, saves audio/video bit streams of a Background Commercials 629 and the user's Background Commercials-viewing record. A selector unit 608 selects between the audio/video bit streams of the regular program 627 and the audio/video bit streams of the Background Commercials 629 stored in the storage device 606 in accordance with the control signal 651 from the control unit 605. The  
25 control unit 605 couples to the User interface 610 to obtain the user's command 653 to view the Audio-Visual Information of the Background Commercials received 629.

Audio/Video decoders 609 decode the selected audio and video coded bit streams 630 and send a decoded video signal 661 to the video reconstruction unit 607. The video reconstruction unit



607 reconstructs the output video 662 from the decoded video output 661 and the rendered Banner Information 628 in accordance with the control signal 652 from the control unit 605.

The control unit 605 also obtains the user's commands 653 to enable/disable the service function, i.e., if the user enables the View-to-Save or View-for-Money service function, as the case may be.

As stated above, the Video Reconstruction unit 607 generates the output video signal 662 from the decoded video 661 and the rendered Banner Information 628. If the user disables the service function, then the Video Reconstruction unit 607 generates the output video signal 662 only with the decoded video 661.

In addition to controlling the selection, storage and play back of the regular program bit streams 617 and the Audio/video Background Commercials bitstreams, the Control unit 605 also receives and interprets the user's commands 653, receives the Background Commercials information data 625 from the Background Commercials extraction and rendering unit 604, controls the storage device(s) 606 to save the audio/video bitstreams 629 to the storage device(s) 606, records the user's Background Commercials-viewing data 671 to the storage device(s) 606, controls the selector unit 608 and the storage device(s) 606 to send the saved audio/video bitstreams of the Background Commercials 629 previously stored in the storage device(s) 606 to the Audio/Video decoders 609 in accordance with the user's request to view the Audio-Visual Information of the Background Commercials received, and reads and manages the user's Background Commercials-viewing record 671 from the storage device(s) 606 and then sends that Background Commercials-viewing record 671 to the service operator 611 through a return channel 612.

Accordingly, it will be understood that the preferred embodiment of the present invention have been disclosed by way of example and that other modifications and alterations may occur to those skilled in the art without departing from the scope and spirit of the appended claims.

Those skilled in the art will appreciate the various adaptations and modifications of the just described preferred embodiments can be configured without departing from the scope and spirit of the invention. Therefore, it is to be understood that, within the scope of the appended claims, the invention may be practiced other than as specifically described herein.